DOCUMENT RESUME

ED 089 606 HE 005 347

AUTHOR Carey, Phillip
TITLE Social and Professional Responsibilities of Engineering Education to the Black Community.
PUB DATE [74]
NOTE 12p.

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS *Engineering Education; *Higher Education; *Minority Groups; Negro Education; Negro Students; *Professional Education; School Community Relationship; *Student Interests

ABSTRACT

It has been known for years now that education for Blacks has been substandard. Environmental problems, historical poverty, prejudice and discrimination, coupled with transiency and defeatism among students, teachers, and parents have all conspired to give the black student a dysfunctional predisposition toward learning and authority in general. This causes many black students to consciously resist the academic training necessary for a professional career. The purpose of this monograph is to suggest that without the recognition of a specific set of social and professional responsibilities to the black community, traditional engineering education shall continue to be viewed with suspicion and distrust by minority group members. Additionally, the paper shall attempt to increase awareness and understanding about the realities of the black American experience, and show how a significant increase in the number of blacks in engineering and related professions is desirable and attainable. The discussion will also highlight the practicalities and importance of minority student recruitment, orientation, and retention at predominantly white institutions of higher education. (Author/PG)

SOCIAL AND PROFESSIONAL RESPONSIBILITIES OF ENGINEERING EDUCATION TO THE BLACK COMMUNITY

By

PHILLIP CAREY

Oklahoma State University
Stillwater, Oklahoma 74074

INTRODUCTION

It has been known for years now that education for Blacks has been substandard. Environmental problems, historical poverty; prejudice and discrimination; the residual effects of slavery; coupled with transiency and defeatism among students, teachers, and parents have all conspired to give the black student a dysfunctional predisposition toward learning and authority in general. By the time the typical black youth reaches high school he has gotten the message through poor report cards, frequent discipling, low test scores, teacher and counselor indifference to his problems that he is not a top candidate for college.[1] And since he cannot see himself as having a realistic chance of holding professional jobs which require higher education, he does not see the purpose of being proficient. What he has seen however, is that the so-called proficient (qualified) black as well as the deficient ones are locked into the same low status--community with substandard housing, inferior schools, menial jobs, and low incomes. Few persons ever tell him that the reason he should master mathematics, physics, or the basic sciences is so he can navigate ships, build highways, pilot jetliners, or even design sky-scrapers. Hence, it becomes difficult, if not impossible for him to accept these possibilities as being real because of the lack of empirical evidence. This causes many black students to consciously resist the academic training necessary for a professional career. As a result, there is a drastic disproportion of black engineers and related professionals in the United States. Imagine, only ONE out of every one hundred graduating engineer is black! It is now therefore imperative

for engineering educators and sociologists to begin working together for a solution to this "real world" problem.

Accordingly, the purpose of this monograph is to suggest that without the recognition of a specific set of social and professional responsibilities to the black community, traditional engineering education shall continue to be viewed with suspicion and distrust by minority group members. Additionally, the paper shall attempt to increase awareness and understanding about the realities of the black American experience, and show how a significant increase in the number of blacks in engineering and related professions is desirable and attainable. The discussion will also highlight the practicalities and importance of minority student recruitment, orientation and retention at predominantly white institutions of higher education.

Toward an Understanding of the Black Experience

A brief review of some statistics having to do with black Americans' income, education, employment/unemployment, and housing should challenge engineering educators to seriously consider the need for greater awareness and increased understanding of the black experience their first set of social and professional responsibilities to the black community.

One of the most basic index of status and success in American life seems to be that of money.[2,3] It takes money to acquire an education which can lead to independence, freedom, and self-respect. As a means to an end, money is power. Yet, those who need it most have the lease amounts and are also less prepared to bargain for it on the open competitive market.

As reflected in Table One,[4] the average (median) income that a black family receives has been lower than that of a white family throughout American history reflecting the lower educational and occupational attainments of blacks as well as the effects of discrimination.

Table I

Median Income of Blacks and Other Minority Families as a Percent of White Family Income, 1959-1969*

Year	% of White Income
1959	52
1960	55
1961	53
1962	53
1963	53
1964	56
1965	55
1966	60
1967	62
1968	63
1969	63

*"Other races" account for approximately 6 - 10% of minority families. Hence, true figures for blacks alone would tend to be even lower.

Table Two[5] suggests some disconcerting and unexpected relationships between black education and income which is to a great extent, the effects of historical racism.

Table II

Median Income of Men 25 Years Old and Over
By Educational Attainment, 1969

Level of Education	Black	White	Black Income as a % of White
A. Elementary:			
Less than 8 years	$2,973	$3,613	82
8 years	4,293	5,460	79
B. High School:			
1 - 3 years	5,222	7,309	71
4 years	6,144	8,631	71
C. College:			
4 or more years	8,567	12,437	69

Thus, at each educational level (A,B,C), blacks with the same educational attainment make less money than their white counterparts. And as can be seen, the higher the educational level the greater the proportional disparity. In terms of income, blacks tend to be discriminated against greatest as they increase their education. This phenomenon alone may account for the defeatist attitude and lack of interest in engineering education that has been observed too frequently in the black student community.

Quest for Liberation: Equity and Equality

Presently, there seems to be a real concern throughout society but especially among engineering educators because members of the minority (black)

community have gone beyond the earlier demands of the civil rights movement by insisting that their rights "to full participation in the society implies not merely the removal of legal barriers, but active affirmative efforts to open up opportunities to them and to assure that they will be in a position to take advantage of these opportunities. Moreover, minorities are insisting on the right to their own identity--the right to be included in the system on their terms, without having to adopt the values, life-styles, and other cultural trappings of the white middle-class majority.[6]

Therefore, another social and professional responsibility of engineering education to the black community seems to be that of providing environments in which black students have equity and equality of opportunity for a professional education. Quite frankly, the obligation of equity and equality means more than adherence to a set of affirmative action plans per se. It even means more than merely insuring equal chances to students with equal abilities. It means assuring students who, because of circumstances of oppression and injustices (due to color), are unprepared for serious academic endeavors. For the most part, these students will measure low in "ability" because of poor high school preparation; they also come from lower income brackets with socially disadvantageous family backgrounds.[7] Providing the milieu in which these kinds of students can learn to discover and evaluate themselves realistically, while at the same time examining critically the relevancy of engineering education to their "real world", is indeed a challenge to all sociologists and engineering educators who are concerned about meaningful compensatory education.

Last year the Purdue University Office of Manpower Studies conducted a major survey of high school seniors in the state of Indiana to ascertain information about

their vocational and educational plans.[8] Although the data pertains only to students in that state, they are of particular interest to people concerned with engineering education and human resources development.

Two parts of the survey, Tables Three and Four below, have a direct application in demonstrating the need for equitable programming to increase the supply of black engineers, technologists, and architects.

Table III

Person or Source Most Helpful in Selecting Engineering for a Career

1.	Relative	32%
2.	Friend	12%
3.	H. S. Courses	14%
4.	Work Experience	12%
5.	TV, Radio Printed Material	14%
6.	H. S. Teacher	7%
7.	Guidance Counselor	7%

Table IV

School Year of Decision on Choice Of Engineering for a Career

1.	Grade 12	53%
2.	Grade 11	24%
3.	Grade 10	9%

The disproportionate low numbers of black graduates in engineering and technology, and the concomitant low numbers of black people employed as engineers, technicians and architects probably indicates that many black high

school students do not have a parent, a relative or friend in engineering, technology, or architecture to emulate and to provide them with incentives and information by which to ignite their interest toward a career in one of these challenging professions. This phenomenon is somewhat unique to blacks in the field of engineering. Consequently, many black high school students are more likely to prepare themselves to matriculate in a field of study other than engineering, technology or architecture. Also, they are likely to by-pass the more advanced courses in mathematics and science (mathematics through trigonometry, general chemistry, and general physics) for which they can foresee no need, but which are necessary foundation courses for anyone preparing for a course of study in the technical fields.

To summarize, when we realize that blacks in particular have been systematically excluded from effective participation in the society by being locked into a self-perpetuating pattern of poverty, substandard living conditions, inadequate education, lack of skills and unequal protection under the law--all mutually reinforcing one another - then, maybe we can begin to understand and help them equitably in their efforts to break out of this vicious cycle. This is the essence of the quest for liberation, equity and equality.

Engineering in Black and White: A responsible Response

> "White America is seeking to keep the walls of segregation substantially intact while the evolution of society and the Negro's desperation is causing them to crumble. The white majority, unprepared and unwilling to accept radical structural change, is resisting and producing chaos while complaining that if there were no chaos orderly change would come."[9]

Simpson and Yanger[10] have shown that before 1950 few jobs were available to blacks in engineering, and few blacks were being trained in the field. War, legislation, the black revolution, and now affirmative action have coalesce to create an impressive demand for black engineers, and related professionals. Encouragingly, since the fifties, the enrollment of black students in engineering and related technical areas has increased but in relative terms, not significantly. For example, in 1955 only 150 or .65% of all graduating engineers were black.[11] And among the 30,000 engineering graduates in this country in 1970 only 200 or .67% were black. As recent as 1972 out of 44,190 engineering graduates only 405 were black of which the vast majority graduated from the predominantly black schools.[12,13]

One cannot help but to agree with Smith that this is a "formula for tragedy" especially when we realize that black Americans comprise over 11% of this Nation's total population. Consequently, the only acceptable solution seems to be for white engineering educational institutions to take bold, innovative, all-out action to increase the supply of black engineering students. And this increase needs to be somewhere in the neighborhood of ten to fifteenfold.[12] Undoubtedly, this is engineering education's paramount social and professional responsibility.

Accordingly, in 1969 the faculty of the School of Electrical Engineering at Oklahoma State University undertook a pilot program to work with approximately 12 black undergraduate students who wanted to prepare for careers in electrical engineering. Some of the students were experiencing academic problems because of inadequate preparation for a curriculum in engineering, some were having difficulty in making social and cultural adjustments to the predominantly white campus life, and some were in need of financial aid.

In initial discussions, the students made it clear that they neither wanted nor expected academic concessions and none were made. Instead, faculty and students agreed to concentrate on special tutoring (in addition to the on-going tutoring program in the Division); special counseling and individual follow-up. Liaison was established with their high school black counselors. A black graduate student worked closely with faculty and students with the result that 5 students earned their B.S. degrees, 2 went on to earn their M.S. degrees, and the black graduate student earned his Ph.D. degree. (Incidentally, the retention rate exceeded the norm for all students in the Division of Engineering-Technology-Architecture).

In the spring of 1973, the Division employed a black professional counselor to recruit students, to counsel them and coordinate their educational programs. Additionally, we provided the recruited students with sources for the necessary finances; special on campus engineering-related activities; tutoring and periodic social sessions.

In the summer of 1973, the Division sponsored a summer session for preparatory course work and orientation engineering, technology and architecture. Twenty-nine black students were recruited and enrolled. Of these, 13 enrolled in engineering, technology, or architecture for the fall semester and 13 enrolled in other educational programs either at OSU or at other institutions. An additional 12 black students enrolled for the first time in the fall semester of 1973 to make a total of 25 freshman black students in engineering-technology-architecture. The cost of recruitment, counseling and guidance, and the expenses incurred by each student during the summer session were underwritten by the Division of Engineering-Technology-Architecture.

Already the results of our initial efforts show that we were more than successful. Our investments in people have begun to pay off. Minority student enrollment has more than doubled this year; and we foresee this trend continuing well into the decade.

In conclusion, may I suggest that the basic objectives of these types of minority students programs should continue to be that of motivating, financing, retaining and graduating students who, because of minority considerations are inadequately prepared to negotiate the challenges and realities of academia. To the extent engineering educators are able to grasp the significance of these socio-cultural effects upon the aspiration levels of black students, will determine the degree of success achieved in the current compensatory activities in recruiting and retaining qualified and qualifiable black engineering students.

REFERENCES

1. Ekberg, D. and Ury, C. "Education for What?" Journal of Negro Education. Vol. 37, 1968, pp.15-22.

2. Wattenberg, B. J. and Scammon, R. M. "Black Progress and Liberal Rhetoric." Commentary, April, 1973, pp.5, 36-44.

3. Merton, R. "The Success-Theme in American Culture." Social Theory and Social Structure. The Free Press: Glenco, Illoinois, 1957.

4. U. S. Department of Labor. Black Americans A Chart Book. 1971, p.38.

5. Ibid. p.82.

6. Kelman, H. "Movements for Individual Rights Stir Winds of Change in America." The Sunday Oklahomian, Section A, December 9, 1973, p.37.

7. Clark, K. B. "The Negro College." The Howard University Magazine, VI, November, 1963.

8. "What's Different About Engineering Students?" Engineering Bulletin, July, 1973.

9. King, M. L. "The Role of the Behavioral Scientist in the Civil Rights Movement." Journal of Social Issues, Vol. 24, 1968, pp.1-12.

10. Simpson, G. E. and Yanger, J. M. Racial and Cultural Minorities: An Analysis of Prejudice and Discrimination. (4th Ed.) Harper and Row: New York, 1972.

11. Howley, L. T. "The Negro's New Economic Life." Fortune, September, 1956, p. 254.

12. Smith, S. J. "Needed: A Ten-fold Increase of Minority Engineering Graduates." (Address to Engineering Education Conference, July 25, 1972). Crotonville, N. Y.